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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/737,119	12/17/2003	Hiroshi Kuroda	XA-10006	5995
181 7590 07/16/2007 MILES & STOCKBRIDGE PC 1751 PINNACLE DRIVE SUITE 500 MCLEAN, VA 22102-3833			EXAMINER NGUYEN, DILINH P	
			ART UNIT	PAPER NUMBER
			2814	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

11/1

<b>Office Action Summary</b>	Application No. 10/737,119	Applicant(s) KURODA ET AL.	
	Examiner DiLinh Nguyen	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 February 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 6-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 6-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1-3 and 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Katagiri et al. (U.S. Pat. 6841881) in view of Lin et al. (U.S. Pat. 6359340).

Katagiri et al. disclose a semiconductor device comprising:

a wiring substrate 1;

a microcomputer chip 2C (fig. 2, column 9, line 62); and

a memory chip 2A or 2B (fig. 2, column 7, line 47), the microcomputer chip and the memory chip being mounted over an upper surface of the wiring substrate, and

wherein the microcomputer chip is constructed as a multiport device including an interface between the microcomputer chip and another part of the system including the memory chip and an interference between the microcomputer chip and outside of the system,

wherein the memory chip is constructed to be accessed from the outside of the system via the microcomputer chip,

wherein the microcomputer chip 2C has a substantially square planar shape (fig. 33),

wherein the memory chip 2A has a substantially rectangular planar shape, with a long side having a greater length than a second side thereof adjacent to the long side (fig. 33),

wherein a length of a side of the microcomputer chip 2C is shorter than a length of a long side of the memory chip 2A (fig. 33), and

wherein the microcomputer chip 2C is mounted over the wiring substrate in a state being stacked over the memory chip such that the microcomputer chip covers a portion of the long side of the memory chip and covers no portion of the second side of the memory chip,

wherein the microcomputer chip includes a first plurality of bonding terminals 13 on an upper surface thereof, and the bonding terminals of the microcomputer chip are disposed along a side of the microcomputer chip adjacent to the second side of the memory chip (figs. 2 and 33).

Katagiri et al. do not explicitly disclose the memory chip includes a second plurality of bonding terminals on an upper surface thereof.

However, Lin et al. disclose a semiconductor device comprising: a substrate 560; a plurality of chips 510, 520 and 540 being mounted over an upper surface of the wiring substrate; the top chip 540 includes a first plurality of bonding terminals on an upper surface thereof, and the bottom chip includes a second plurality of bonding terminals on an upper surface thereof (cover fig.). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the bottom chip includes a second plurality of bonding terminals on an upper surface thereof as

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taught by Lin et al. into the device of Katagiri et al., in order to allow a larger processing window during wire bonding, thereby enhancing the reliability of bonding wires for the underlying chip.

- Regarding claim 2, Katagiri et al. discloses that the microcomputer chip 2C is connected to first electrodes 9 of said wiring substrate via a plurality of bonding wires 8, the memory chip 2A is connected to second electrodes of said wiring substrate via a plurality of bump electrodes 4, said first electrodes are arranged toward an outer periphery side of said wiring substrate from the second electrodes (fig. 2).
  - Regarding claim 3, Katagiri et al. disclose that the memory chip includes a flash memory (column 7, line 47).
  - Regarding claim 10, Katagiri et al. disclose that the microcomputer chip and the memory chip have respective terminals, a number of terminals of the microcomputer chip being much greater than a number of terminals of the memory chip (figs. 2 and 33).
  - Regarding claim 11, Katagiri et al. disclose that the terminals of the memory chip 2A or 2B are arranged such that they are not superposed over the terminals of the microcomputer chip in a plan view (fig. 2 and 33).
3. Claims 1-3 and 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Kado et al. (U.S. Pat. 7042073) in view of Lin et al. (U.S. Pat. 6359340).

Kado et al. disclose a semiconductor device comprising:  
a wiring substrate 1;

a microcomputer chip 2C (cover fig., abstract); and

a memory chip 2A or 2B (cover fig., abstract), the microcomputer chip and the memory chip being mounted over an upper surface of the wiring substrate, and

wherein the microcomputer chip is constructed as a multiport device including an interface between the microcomputer chip and another part of the system including the memory chip and an interference between the microcomputer chip and outside of the system,

wherein the memory chip is constructed to be accessed from the outside of the system via the microcomputer chip,

wherein the microcomputer chip 2C has a substantially square planar shape (fig. 17),

wherein the memory chip 2A has a substantially rectangular planar shape, with a long side having a greater length than a second side thereof adjacent to the long side (fig. 17),

wherein a length of a side of the microcomputer chip 2C is shorter than a length of a long side of the memory chip 2A (fig. 17), and

wherein the microcomputer chip 2C is mounted over the wiring substrate in a state being stacked over the memory chip such that the microcomputer chip covers a portion of the long side of the memory chip and covers no portion of the side of the memory chip adjacent to the long side (cover fig. and fig. 17).

Kado et al. do not explicitly disclose the memory chip includes a second plurality of bonding terminals on an upper surface thereof.

However, Lin et al. disclose a semiconductor device comprising: a substrate 560; a plurality of chips 510, 520 and 540 being mounted over an upper surface of the wiring substrate; the top chip 540 includes a first plurality of bonding terminals on an upper surface thereof, and the bottom chip includes a second plurality of bonding terminals on an upper surface thereof (cover fig.). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the bottom chip includes a second plurality of bonding terminals on an upper surface thereof as taught by Lin et al. into the device of Kado et al., in order to allow a larger processing window during wire bonding, thereby enhancing the reliability of bonding wires for the underlying chip.

- Regarding claim 2, Kado et al. discloses that the microcomputer chip 2C is connected to first electrodes 9 of said wiring substrate via a plurality of bonding wires 8, the memory chip 2A or 2B is connected to second electrodes of said wiring substrate via a plurality of bump electrodes 4, said first electrodes are arranged toward an outer periphery side of said wiring substrate from the second electrodes (cover fig.).
- Regarding claim 3, Kado et al. disclose that the memory chip includes a flash memory (cover fig., abstract).
- Regarding claim 10, Kado et al. disclose that the microcomputer chip and the memory chip have respective terminals, a number of terminals of the microcomputer chip being much greater than a number of terminals of the memory chip (fig. 17).

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- Regarding claim 11, Kado et al. disclose that the terminals of the memory chip 2A or 2B are arranged such that they are not superposed over the terminals of the microcomputer chip in a plan view (cover fig. and fig. 17).

4. Claims 1-3 and 6-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroaki et al. (JP. 2001-291821) in view of Kanemoto et al. (U.S. Pat. 6410987) and further in view of Goller et al. (U.S. Pat. 6683374).

- Regarding claims 1 and 6, Hiroaki et al. disclose a semiconductor device comprising:

a wiring substrate 8;

an upper chip 14; and

a lower chip 10 or 12, the upper chip and the lower chip being mounted over an upper surface of the wiring substrate, and

wherein the upper chip is constructed as a multiport device including an interface between the upper chip and another part of the system including the lower chip and an interference between the upper chip and outside of the system,

wherein the lower chip is constructed to be accessed from the outside of the system via the upper chip,

wherein the upper chip 14 has a substantially square planar shape,

wherein the lower chip 10 or 12 has a substantially rectangular planar shape, with a long side having a greater length than a second side thereof adjacent to the long side,



wherein a length of a side of the upper chip 14 is shorter than a length of a long side of the lower chip, and

wherein the upper chip 14 is mounted over the wiring substrate 8 in as state being stacked over the lower chip 10 or 12 (fig. 1, abstract).

Hiroaki et al. do not explicitly disclose the upper chip and lower chips are the microcomputer chip or the memory chip such that the microcomputer chip covers a portion of the long side of the memory chip and covers no portion of the side of the memory chip adjacent to the long side.

However, Kanemoto et al. disclose a semiconductor device comprising: a square ASIC (microcomputer) chip 2 is stacked over a rectangular flash memory chip 3 (fig. 5, column 9, lines 33-42) in order to select the flash memory chip or the microcomputer chip in the chips of Hiroaki et al. because it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987).

Goller et al. disclose a semiconductor device comprising : a chip 2 has a substantially square planar shape; a chip 1 has a substantially square planar shape; wherein the chip 1 has a substantially rectangular planar shape with a long side having a greater length than a side thereof adjacent to the long side, wherein a length of a side of the chip 1 is shorter than a length of the long side of the chip 1 such that the chip 2 cover a portion of the long side of the chip 1 and covers no portion of the side of the chip 1 adjacent to the long side, wherein the chip 1 includes a first plurality of bonding

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terminals on an upper surface thereof, and the chip 2 includes a second plurality of bonding terminals on an upper surface thereof, wherein the bonding terminals of the chip 2 are disposed along the second side of the chip 2, and the bonding terminals of the chip 1 are disposed along a side of the chip 1 adjacent to the second side of the chip 2 (figs. 3 and 5), in order to provide a semiconductor package structure with reliably connected electrically to one another in a small space (fig. 5).

Therefore, it would have been obvious to one having ordinary in the art at the time the invention was made to select the flash memory chip or the microcomputer chip in the chips of Hiroaki et al. and the microcomputer chip covers a portion of the long side of the memory chip and covers no portion of the side of the memory chip adjacent to the long side as taught by Goller et al. in to the device of Hiroaki et al. because it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987) and in order to provide a semiconductor package structure with reliably connected electrically to one another in a small space.

- Regarding claim 2, Hiroaki et al. discloses that the upper chip 14 is connected to first electrodes of said wiring substrate 8 via a plurality of bonding wires 19, the lower chip 10 or 12 is connected to second electrodes of said wiring substrate 8 via a plurality of bonding wires 17, said first electrodes are arranged toward an outer periphery side of said wiring substrate from the second electrodes (fig. 1).

- Regarding claim 3, Kanemoto et al. disclose that the memory chip includes a flash memory (fig. 5, column 9, lines 36-37).
- Regarding claim 7, Hiroaki et al. disclose that the upper chip 14 is connected to first electrode of the wiring substrate 8 via a plurality of bonding wires 19, a lower chip 10 of the two chips is connected to second electrodes of the wiring substrate 8 via a plurality of bumps electrodes 9, the chip 12 is connected to third electrodes of the wiring substrate 8 via a plurality of bonding wires 17, the first electrodes are arranged toward an outer periphery of the wiring substrate from the second and third electrodes (fig. 1, abstract).
- Regarding claim 8, Kanemoto et al. disclose a semiconductor device comprising the memory chip includes a flash memory (fig. 5, column 9, lines 36-37) and it would have been obvious to one having ordinary skill in the art to form the lower chip 10 or 12 of Hiroaki et al. includes DRAM.
- Regarding claim 9, Hiroaki et al. disclose a lower surface of the wiring substrate 8 is formed with a plurality of bump electrodes 22 constructing external connection terminals (fig. 1).
- Regarding claim 10, Hiroaki et al. disclose the upper chip 14 and the lower chips 10 or 12 have respective terminals, and it would have been obvious to form a number of terminals of the upper chip being much greater than a number of terminals of the lower chips (fig. 1). Moreover, the number of terminals would have been obvious to an ordinary artisan practicing the invention because, absent evidence of disclosure of criticality for the number of terminals giving unexpected results, it is not inventive to

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discover number by routine experimentation. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). Furthermore, the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen number or upon another variable recited in a claim, the Applicant must show that the chosen number is critical. See *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

- Regarding claim 11, Hiroaki et al. disclose the terminals of the lower chips 10 or 12 are arranged such that they are not superposed over the terminals of the upper chip 14 in plan view (fig. 1).
- Regarding claim 12, Hiroaki et al. disclose that an under fill resin 21 is filled in a gap between the lower chip 10 and the wiring substrate 8 (fig. 1).
- Regarding claim 13, Goller et al. disclose that the two chips are arranged such that the long side of one of the memory chips crosses the long side of the other (fig. 3).

### **Conclusion**

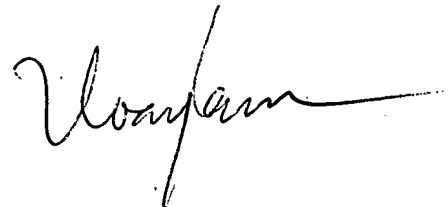
Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 5:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DLN

A handwritten signature in black ink, appearing to read 'Hoai Pham', with a long horizontal flourish extending to the right.

HOAI PHAM  
PRIMARY EXAMINER